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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/715,107

11/18/2003

Junichiro Hara

062709-0117

3998

22428

7590

06/22/2006

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EXAMINER

EDWARDS, LOREN C

ART UNIT

PAPER NUMBER

3748

DATE MAILED: 06/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/715,107

Applicant(s)

HARA, JUNICHIRO

Examiner

Loren C. Edwards

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/9/06.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. An Applicant's Amendment filed on 5/9/06 has been entered. Claims 1, 4, 5, and 10-13 have been amended; and claim 14 has been added. Overall, claims 1-14 are pending in the application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1, 2, and 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole et al. (U.S. 6,318,077) in view of Grant et al. (U.S. 6,272,850). Claypole discloses an exhaust-heat recovery system for a vehicle comprising: a catalytic converter (Claypole; Fig. 1, No. 34; Col. 3, Lines 34-38) configured to let pass exhaust discharged from an engine and to burn catalytically combustible components in the exhaust; an exhaust heat exchanger (Claypole; Fig. 1, Nos. 38 and 60; Col. 3, Lines 39-41; Col. 3, Lines 63-65) configured to exchange heat between the exhaust having

passed through the catalytic converter and a heat transfer medium having passed through the engine; and an air conditioner (Claypole; Fig. 1; Col. 4, Lines 42-54) with a heat exchanger configured to generate a heating wind by means of the heat exchange between the heat-transfer medium having passed through the exhaust heat exchanger and an air conditioning wind. Claypole fails to specifically describe an engine controller configured to perform an incremental control for increasing the combustible components in the exhaust to be burned in the catalytic converter by means of changing an operation condition of the engine when a prescribed heating condition is unsatisfied. Grant discloses a catalytic converter temperature control system that uses unburned hydrocarbons, by making the charge rich, to elevate and maintain the temperature of a catalyst (Grant; Abstract; Figs. 2, and 3; Col. 2, Line 55 – Col. 3, Line 42). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the control of Grant in the system of Claypole for the advantage of being able to bring a catalyst to operating temperature and maintain that temperature using no additional injection hardware.

5. With regards to claim 2, the modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, and further wherein the incremental control on the combustible components is such that the amount of unburned hydrocarbon in the exhaust discharged from the engine is increased (Grant; Col. 2, Line 62 – Col. 3, Line 5; Abstract).

6. With regards to claim 4, the modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, and further wherein the prescribed

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heating condition is specified by at least one of a temperature of the heat-transfer medium, a demand for an increase in heating power of the air conditioner, and an exchange heat quantity in the exhaust heat exchanger (Claypole; Col. 4, Lines 42-54).

7. With regards to claim 5, the modified Claypole discloses the exhaust-heat recovery system of claim 4, as described above, and further wherein the temperature of the heat-transfer medium is measured at, at least one of a heat-transfer medium channel from the engine to the exhaust heat exchanger, a transfer medium channel from the exhaust heat exchanger to the heat exchanger, a heat-transfer medium channel from the heat exchanger to the engine, a heat-transfer medium passage within the engine, a heat-transfer medium passage within the exhaust heat exchanger and a heat-transfer medium passage within the heat exchanger (Claypole; Fig. 1, No. 74; Col. 3, Lines 53-55).

8. With regards to claim 6, the modified Claypole discloses the exhaust-heat recovery system of claim 4, as described above, and further wherein the demand for an increase in heating power of the air conditioner is outputted from the air conditioner on the basis of at least one of the difference between a target temperature in the vehicle set by an occupant and an actual temperature in the vehicle or an actual temperature outside the vehicle, and a target temperature of an air conditioning wind at an outlet thereof (Claypole; Col. 4, Lines 46-48).

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 2 above, and further in view of Nozawa et al. (U.S. 6,266,957). The modified Claypole discloses the exhaust-heat recovery system of claim 1, as described

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above, but fails to specifically discuss the incremental control on the combustible components being performed when the vehicle is at rest but the engine is still in operation. Nozawa discloses a catalyst activation control system for engines that enables catalyst warm-up when the engine is in park or neutral (Nozawa; Col. 10, Lines 48-65). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the catalyst activation control as taught by Nozawa in the system of Claypole for the advantage of rapid temperature rise to activate the catalyst after cold starts.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 4 above, and further in view of Barroni-Bird et al. (U.S. 5,983,628). The modified Claypole discloses the exhaust-heat recovery system of claim 4, as described above, but fails to specifically describe the system wherein the exchanged heat quantity in the exhaust heat exchanger is calculated from at least one of the differences between a temperature of the heat-transfer medium at an inlet portion of the exhaust heat exchanger and that at an outlet portion of the exhaust heat exchanger, the difference between a temperature of the exhaust at an inlet portion of the exhaust heat exchanger and that at an outlet portion of the exhaust heat exchanger, the difference between a volumetric flow rate of the exhaust at an inlet portion of the exhaust heat exchanger and that at an outlet portion of the exhaust heat exchanger, the exhaust volume in the engine, the exhaust temperature in the engine, the amount of fuel used in the engine, and the amount of air used in the engine. Barroni-Bird discloses a system and method for controlling exhaust gas temperatures for increasing catalyst conversion

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that has temperature sensors located immediately upstream and downstream of a heat exchanger (Barroni-Bird; Fig. 1, Nos. 52 and 54). These sensors are used to determine the amount of heat dissipated by the exchanger (Barroni-Bird; Col. 4, Line 40 – Col. 5, Line 3). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the heat exchanged quantity detection as taught by Barroni-Bird in the system of Claypole for the advantage of being able to control the temperature of the exhaust emissions (Barroni-Bird; Col. 2, Lines 19-31).

11. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 1 above, and further in view of Rim (U.S. 6,739,579). The modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, but fails to specifically disclose: a bypass channel along which the exhaust having passed through the catalytic converter passes bypassing the exhaust heat exchanger; a main channel along which the exhaust having passed through the catalytic converter passes through the exhaust heat exchanger; and an exhaust channel switching valve for closing either the bypass channel or the main channel. Rim discloses an exhaust valve for combustion engines comprising a bypass channel along which the exhaust having passed through the catalytic converter passes bypassing the heat exchanger (Rim; Fig. 2, No. 28; Col. 3, Lines 1-51); a main channel along which the exhaust having passed through the catalytic converter passes through the exhaust heat exchanger (Rim; Fig. 2, No. 34; Col. 3, Lines 1-51); and an exhaust channel switching valve for closing either the bypass channel or the main channel (Rim; Fig. 2, No. 10; Col. 3, Lines 1-51). It would have been obvious to one having ordinary skill in

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the art at the time the invention was made to utilize the bypass valve system of Rim in the system of Claypole for the advantage of being able to throttle the amount of additional heat added to the engine coolant.

12. With regards to claim 9, the modified Claypole of claim 8 discloses the exhaust-heat recovery system of claim 1, as described above, and further wherein the exhaust discharged from the engine passes sequentially through the catalytic converter, the exhaust heat exchanger and a muffler toward the downstream side of the engine, and then is discharged into the air (Rim; Fig. 1, Nos. 22, 12, 24, and 26; Col. 3, lines 1-51).

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 1 above, and further in view of Tramontini (U.S. 3,223,150). The modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, but fails to specifically discuss the heat-transfer medium flowing out of the engine, passing sequentially through the exhaust heat exchanger, the heat exchanger for heating the passenger compartment, and returning to the engine. Tramontini discloses a heat exchanger where engine coolant is fed through a heat exchanger in the exhaust track (Tramontini; Fig. 1, No. 40), through a heat exchanger in the passenger compartment (Tramontini; Fig. 1, No. 18), and then returns to the engine (Tramontini; Fig. 1, No. 26). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the heat exchanger as taught by Tramontini in the system of Claypole for the advantage of shortening the time required to bring the coolant in the system to a sufficient temperature to supply heat to the passenger cabin (Tramontini; Col. 1, Lines 51-56).

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14. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 1 above, and further in view of Bennett (U.S. 6,151,891). The modified Claypole discloses the exhaust-heat recovery system according to claim 1, as described above, but fails to fully describe the system comprising an oil warmer for generating the heat exchange between the heat-transfer medium and a transmission lubricant on the downstream side of the heat exchanger for heating. Bennett discloses a heat exchanger for a motor vehicle exhaust that is can be used to heat the transmission oil (Bennett; Fig. 7; Col 6, Lines 19-28). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the exhaust heat exchange system as taught by Bennett in the system of Claypole for the advantage of rapidly bringing the transmission oil up to nominal operating temperature and to avoid transmission damage.

15. With regards to claim 13, the modified Claypole discloses the exhaust-heat recovery system of claim 12, as described above, and further comprising: a bypass channel along which the heat-transfer medium passes bypassing the oil warmer; a main channel along which the heat-transfer medium passed through the oil warmer; and a warmer switching valve for closing either the bypass channel or the main channel (Bennett; Fig. 7, 8a, and 8b; Col. 5, Lines 15-30; Col 5, Line 5 – Col. 6, Line 18).

16. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 1 above, and further in view of Bennett (U.S. 6,151,891). The modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, but fails to specifically disclose a bypass channel along which the heat-transfer

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medium is directly delivered bypassing the exhaust heat exchanger from the engine to the heat exchanger for heating; a main channel along which the heat-transfer medium passes through the exhaust heat exchanger; and a medium channel switching valve for closing either the bypass channel or the main channel. Bennett discloses a heat exchanger for a motor vehicle exhaust that heats transmission oil and has the ability to bypass this circuit so that no heat is exchanged with the transmission oil (Bennett; Fig. 7, 8a, and 8b; Col. 5, Lines 15-30; Col 5, Line 5 – Col. 6, Line 18). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the bypass circuit as taught by Bennett in the system of Claypole, for the advantage of being able to more precisely control the cabin heat source.

17. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 1 above, and further in view of Nishimura et al. (U.S. 6,044,642).

The modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, but fails to specifically discuss wherein the prescribed heating condition is a minimum temperature of a coolant. Nishimura discloses a direct fuel injection system that uses fuel injected into the engine to control the temperature of a catalyst and further judges the temperature of the catalyst based on the engines coolant temperature (Nishimura; Col. 3, Lines 34-40). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the catalyst temperature judging means as taught by Nishimura in the system of Claypole for the advantage of a sensing the catalyst temperature without additional hardware.

Response to Arguments

18. Applicant's arguments with respect to claims 1-13 have been considered but are moot in view of the new ground(s) of rejection.

19. With regards to the argument that Grant fails to teach or suggest adjusting the combustible components in the exhaust in the catalytic converter, the Examiner disagrees. The Examiner specifically points to the oxygen sensors located in the exhaust track of Grant, and the use of these sensors in a feedback routine to increase the temperature of the catalyst. Grant uses the sensed oxygen content as an indication of the air/fuel ratio in the exhaust and further uses this in a control loop to adjust and maintain the temperature of the catalyst in the system via a rich air/fuel ratio that supplies excess fuel to the catalyst. While Grant does not describe there being unburned hydrocarbon in the exhaust expressly, it is known that the fuel portion of the air/fuel, which has been sensed in the exhaust, is unburned hydrocarbon.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Loren C. Edwards whose telephone number is (571) 272-2756. The examiner can normally be reached on M-TH 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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